

## MEETING NOTES

### Waste Management Area C RCRA Facility Investigation Report

**MEETING DATE:** October 1, 2014

**LOCATION:** Washington State Department of Ecology Office, Richland, WA

**ATTENDEES:**

Ryan Beach (DOE-ORP)	Rebecca Gerhart (EPA)*
Marcel Bergeron (WRPS)	Doug Hildebrand (DOE-ORP)
Mike Barnes (Ecology)	Chris Kemp (DOE-ORP)
Joe Caggiano (Ecology)	Julie Robertson (Freestone)
Neil Davis (WRPS)	Cindy Tabor (WRPS)
Susan Eberlein (WRPS)	Greg Thomas (CHPRC)
Les Fort (WRPS)	Becky Wiegman (WRPS)

\*by telephone

**PURPOSE OF MEETING:** The meeting was called to promote discussion among Ecology, EPA, DOE-ORP, DOE-RL, CHPRC, and WRPS on the RCRA facility investigation (RFI) report being developed for Waste Management Area C (WMA C). Lists of expectations, agreements, and actions (including the status of any actions) will be documented in the meeting notes.

**PRIOR MEETING NOTES:** Ms. Robertson reported that notes from previous meetings about the WMA C RFI report are in the *Hanford Federal Facility Agreement and Consent Order* Administrative Record. The attendees reviewed a list of expectations and open action items remaining from the prior meeting (August 14, 2014). The results of the discussion are recorded in tables at the end of these meeting notes. Closed actions will be removed from the list after DOE and Ecology have agreed to close the action.

**DRAFT RFI REPORT OUTLINE:** Ms. Robertson distributed copies of the current draft report outline (Attachment A), noting changes made since August 2014 as document preparation continues.

**NATURE AND EXTENT:** Ms. Tabor presented several draft tables and figures that provided information about WMA C vadose zone soil sample locations, analytical data, and geophysical studies (Attachment B). The RFI report will include separate tables containing analytical data sorted by either location/investigation group or by constituent to support data evaluation. The report will also contain figures to illustrate stratigraphy at borehole sites together with borehole logging information and vadose zone analytical results with depth. Ecology and EPA complimented the effort being put into clearly presenting the large amount of vadose zone characterization information gathered at WMA C.

**UPCOMING MEETING:** The attendees tentatively agreed to meet in November 2014, with a specific date and time to be determined.

**ATTACHMENTS:**

- Attachment A: Draft WMA C RFI Report Outline – September 30, 2014 (4 pages)
- Attachment B: Nature and Extent of Contamination – Draft Figure and Table Hand-Outs, October 1, 2014 (10 pages)

R Douglas Hildebrand  
DOE Project Manager (print)

R Douglas Hildebrand  
DOE Project Manager (signature)

10-24-2014  
Date

Michael W Barnes  
Ecology Project Manager (print)

Michael W Barnes  
Ecology Project Manager (signature)

10-29-2014  
Date

EXPECTATIONS.	
3/26/2014	1. Ecology expressed an expectation that characterization information for all equipment in the Part A will be discussed in the RFI report. On 10/1/2014, DOE reported that this expectation is being addressed in TPA change package M-45-14-03.
10/1/2014	1. Ecology expects that WRPS/DOE will review vadose zone PCB results and evaluate whether contamination can be attributed to C-200 tanks (specifically, C-203) vs. pipelines connecting the C-200s to Strontium Semi-Works (where pumps contained PCBs that may have leaked).

ACTIONS.			
Action Number	Actionee	Description	Status
2014-02-26-1	Hildebrand	DOE will prepare a TPA change package to address the need to revise TPA milestone M-045-61, which calls for submittal of an RFI/CMS report.	Closed. DOE submitted signed change package M-45-14-03 on 9/30/2014.
2014-02-26-3	Tabor, Robertson	Contact Rebecca Gerhart (EPA) after 3/9/2014 to discuss desired level of detail to include in RFI report. Consider level of detail in recent 100 Area RI/FS reports. Propose inclusion of summary level information in document and hyperlinks to other documents that provide more detail.	Open. Initial meeting held 4/28/2014. Discussions are ongoing.
2014-03-26-1	Tabor, Robertson	Schedule future meeting to review the conceptual site model and stratigraphy at WMA C.	Open. WRPS and DOE will seek clarification from Ecology on the desired discussion topic and schedule a meeting as necessary.
2014-08-01	Tabor	Identify whether any new unplanned releases have been identified as a part of the most recent leak loss assessment update effort.	Closed. WRPS reported no new UPRs were identified.

<b>AGREEMENTS. (2 pages)</b>	
<b>Agreement Date</b>	<b>Description of the Agreement</b>
1/23/2014	1. The RFI report will <b>identify information gaps</b> . Such gaps will be resolved through future efforts prior to submittal of the WMA C CMS. The meeting attendees felt that this process of gap identification and resolution will support future work prioritization agreements.
	2. Ecology agrees to the <b>use of the proposed revised RFI report outline</b> shown in Attachment 1.
2/26/2014	1. The section that addresses regional geology should <b>use pictures/graphics from the 2010 Natural Systems WMA C Performance Assessment working session</b> to illustrate the uniqueness of the site (illustrate geology, depict river channeling impacts, etc.).
	2. The description of field sampling techniques should <b>describe process improvements made over time</b> and any effects those improvements have made on how the data is interpreted (e.g., surface geophysical exploration, number of samples that can be taken from push borehole).
	3. The RFI report should <b>reflect on information contained in weekly radiological field survey reports ("rounds sheets")</b> regarding surface contamination in C Farm. Mr. Barnes noted that many of the unplanned release sites associated with C Farm are based on airborne or surface contamination events, and many of these sites no longer exist (e.g., have been remediated or have dissipated). Such releases are generally documented as "unplanned releases." Convey point that although the surface may be considered uncontaminated today, shallow subsurface contamination may exist across the farm.
	4. The RFI report should <b>describe changes made in characterization planning as field work progressed</b> . For example, in the area near the C-200 tanks, initial planning called for direct push investigation. Subsequently, the agencies agreed to investigate that area using surface geophysical exploration (SGE) initially, followed by use of direct push investigation as deemed necessary and feasible based on SGE results and physical limitations in that location.
	5. RFI report sections regarding <b>nature and extent of contamination and human health and risk assessment will be consistent with information being developed for the separate but parallel WMA C Performance Assessment</b> effort. The RFI report will incorporate whatever information is available on the topics; information gaps will be identified for subsequent resolution.
2/26/2014 and 3/26/2014	1. To the extent practicable, the RFI report will <b>include information about liquid sources near or at the surface</b> (e.g., equipment decontamination activities within the farm, fire hydrant testing, water lines, snow melt, ponds/cribs/ditches) that may have been sources of contamination and/or water infiltration. <b>Also include UPR descriptions</b> from WIDS. DOE/RL-88-30 ( <i>Hanford Site Waste Management Units Report</i> ), tank leak-loss reports, the WMA A-AX/C Field Investigation Report, and GJO-98-39-TAR, GJO-HAN-18 ( <i>Hanford Tank Farms Vadose Zone: C Tank Farm Report</i> ) will be reviewed for relevance.
	2. The RFI report will <b>include characterization information from dry wells, boreholes, direct pushes, and near-surface sampling</b> . It will also include characterization information from leaks associated with ancillary equipment (pipelines, French drains, C-301, etc.).
	3. The RFI report <b>table of contents should include a section that refers to the conceptual site model</b> . (This information is currently slated to go into Section 5.3.1.) CSM illustrations in RFI report should be consistent with WMA C Performance Assessment

**AGREEMENTS. (2 pages)**

Agreement Date	Description of the Agreement
	models related to nature and extent of contamination if no action were taken.
3/26/2014	<ol style="list-style-type: none"> <li>1. The introductory section of the RFI document will <b>incorporate relevant information from the WMA C Phase 2 work plan</b> (RPP-PLAN-39114), particularly regarding regulatory framework and the regulatory decision-making process.</li> <li>2. The RFI report will <b>incorporate published information about the groundwater monitoring program and groundwater contamination</b>, including Tc-99, iodine, and nitrate.</li> <li>3. The section of the RFI report describing the tank system will <b>include individual tank timelines</b> (the "Caggiano diagrams") associated with leaks/losses as well as findings from tank leak-loss reports.</li> <li>4. Using information in published reports, the RFI report will <b>include information about upgradient facilities that are possible sources of groundwater contamination</b> at WMA C.</li> <li>5. The write up of Phase 2 field work will <b>include time frame when work was conducted/samples taken</b> at specific locations.</li> <li>6. Terms such as "surface" and "sub-surface" will be defined and used consistently.</li> <li>7. <b>Discuss data validation/quality</b> (e.g., Tc-99 data quality as it relates to analytical method used) in the RFI report. This information is currently slated to go into Section 5.2.1.</li> <li>8. <b>Notes from routine monthly 2011 and 2014 meetings</b> regarding the development of the RFI <b>will be incorporated</b> into the RFI report.</li> </ol>
8/14/2014	<ol style="list-style-type: none"> <li>1. The WMA C baseline risk assessment will include evaluation of unrestricted, Native American, and other scenarios.</li> <li>2. WRPS and CHPRC will evaluate recently-released EPA guidance on soil screening levels for protection of groundwater for radionuclides.</li> <li>3. RFI report and/or risk assessment documentation will review vadose zone PCB data to support evaluation of possible sources (i.e., C-200 tanks/241-C-203 and leaks from pipelines from Strontium Semi-Works/PCB-containing pumps).</li> <li>4. Both the RFI report and the WMA C risk assessment will identify data/information gaps that may require future revisions of those documents.</li> <li>5. Gamma logs will be included in the RFI report (electronic link or appendix). A summary of spectral gamma data collected at selected locations in the vicinity of WMA C is also being prepared as a supporting appendix to the RFI report.</li> </ol>

**ATTACHMENT A: Draft WMA C RFI Report Outline**  
**September 30, 2014**

**SECTION 1.0 INTRODUCTION**

**1.1 PURPOSE AND SCOPE**

1.1.1 Definitions

1.1.2 Single-Shell Tank System Closure

1.1.2.1 *National Environmental Policy Act of 1969 and State Environmental Policy Act of 1971* Decisions

1.1.2.2 Closure Under the *Resource Conservation and Recovery Act of 1976*

1.1.2.3 Closure Under the *Atomic Energy Act of 1954*

1.1.2.4 Waste Management Area C Performance Assessment

1.1.3 Groundwater Remediation

**1.2 DOCUMENT STRUCTURE**

**1.3 WMA C SITE DESCRIPTION**

**1.4 SUMMARY OF *RESOURCE CONSERVATION AND RECOVERY ACT* FACILITY INVESTIGATIONS**

1.4.1 Phase 1 Investigation

1.4.2 Phase 1 Near-Term Characterization

1.4.3 Phase 2 Investigation

**SECTION 2.0 SITE BACKGROUND AND ENVIRONMENTAL SETTING**

**2.1 SITE DESCRIPTION**

**2.2 REGIONAL HISTORY AND HANFORD OPERATIONS**

2.2.1 Historical Overview

2.2.2 Operations, Facilities, and Processes

2.2.3 Contaminant Sources

2.2.4 Waste Management

**2.3 HANFORD SITE AND REGIONAL ENVIRONMENTAL SETTING**

2.3.1 Topography

2.3.2 Climate

2.3.3 Geology

2.3.3.1 100 Areas

2.3.3.2 200 Areas

2.3.3.3 300 Area

2.3.4 Surface Water

2.3.5 Vadose Zone Recharge

2.3.6 Groundwater

2.3.7 Vegetation and Wildlife

2.3.8 Land Use

**2.4 WMA C SITE ENVIRONMENTAL SETTING**

2.4.1 Topography

2.4.2 Geology

2.4.2.1 Vadose Zone Soils

2.4.3 Surface Water

2.4.4 Vadose Zone Recharge

2.4.5 Enhanced Recharge and Preferential Pathways

2.4.5.1 Meteorological Events

2.4.5.2 Water Lines

2.4.5.3 Fire Hydrants

- 2.4.5.4 Cribs/Ponds/Ditches/Trenches in the Vicinity of WMA C
- 2.4.5.5 Unplanned Releases (UPRs) and Waste Pipeline Leaks
- 2.4.5.6 Miscellaneous Structures
- 2.4.5.7 Decontamination Activities
- 2.4.5.8 Drywells
- 2.4.5.9 Clastic Dikes
- 2.4.6 Groundwater
  - 2.4.6.1 Aquifer Thickness
  - 2.4.6.2 Groundwater Flow rate and Direction
  - 2.4.6.3 Groundwater Monitoring Program
- 2.4.7 Vegetation and Wildlife
- 2.4.8 Land Use

## **SECTION 3.0 WMA C SITE DESCRIPTION**

### **3.1 LOCATION AND SITE DESCRIPTION**

### **3.2 UNIT DESIGN AND OPERATING CHARACTERISTICS**

- 3.2.1 Single Shell Tanks
- 3.2.2 Ancillary Equipment
  - 3.2.2.1 Transfer Lines
  - 3.2.2.2 Diversion Boxes
  - 3.2.2.3 Catch Tank 241-C-301
  - 3.2.2.4 244-CR Vault
  - 3.2.2.5 Valve Boxes/Pits
  - 3.2.2.6 241-C-801 Cesium Loadout Facility
  - 3.2.2.7 French Drains
  - 3.2.2.8 2607-EG Septic Tank

### **3.3 WASTE TYPES AND WASTE PROCESSING HISTORY**

- 3.3.1 100-Series Tanks Waste Streams
  - 3.3.1.1 Bismuth Phosphate Process Wastes
  - 3.3.1.2 Tri-Butyl Phosphate Waste
  - 3.3.1.3 Plutonium Uranium Extraction, B Plan, Reduction-Oxidation, and Miscellaneous Wastes
- 3.3.2 200-Series Tanks Waste Streams

### **3.4 INTERIM STABILIZATION**

### **3.5 WASTE RETRIEVAL TECHNOLOGY**

- 3.5.1 Modified Sluicing Technology
- 3.5.2 Mobile Arm Retrieval System
- 3.5.3 Vacuum Retrieval Technology

### **3.6 RESIDUAL WASTE INVENTORY**

- 3.6.1 Retrieved Tanks
- 3.6.2 Not-Yet Retrieved Tanks
- 3.6.3 Ancillary Equipment

### **3.7 ASSESSMENT OF KNOWN OR SUSPECTED UNPLANNED RELEASES AT WMA C**

- 3.7.1 Releases from Single-Shell Tanks
  - 3.7.1.1 Tank 241-C-101 Tank Leak Investigation
  - 3.7.1.2 Tank 241-C-105 Tank Leak Investigation
  - 3.7.1.3 Tank 241-C-110 Tank Leak Investigation
  - 3.7.1.4 Tank 241-C-111 Tank Leak Investigation
  - 3.7.1.5 C-200 Series Single-Shell Tank Leak Investigation
- 3.7.2 Possible Releases from Single-Shell Tanks Not Included in the DQO
- 3.7.3 Unplanned Releases

- 3.7.4 Waste Losses From Spare Inlet Nozzles and Cascade Lines
- 3.7.5 Suspected Pipeline Waste Loss Events

#### **SECTION 4.0 FIELD INVESTIGATION PROGRAM**

- 4.1 PREVIOUS/OTHER INVESTIGATIONS
- 4.2 PHASE 1 RCRA FACILITY INVESTIGATION
  - 4.2.1 Characterizing Soil Around Tank 241-C-105 (Installation of C4297)
  - 4.2.2 Characterizing UPR-200-E-82
  - 4.2.3 Collecting Samples from RCRA Monitoring Well 299-E-27-22
  - 4.2.4 Surface Geophysical Exploration
  - 4.2.5 Testing Direct Push Technology
  - 4.2.6 Phase 1 Conclusions and Recommendations
- 4.3 PHASE 1 NEAR-TERM CHARACTERIZATION
  - 4.3.1 UPR-200-E-86
  - 4.3.2 UPR-200-E-81
- 4.4 PHASE 2 RCRA FACILITY INVESTIGATION
  - 4.4.1 Phase 2 Investigative Basis and Approach
  - 4.4.2 Phase 2 Direct Push Characterization and Analysis
  - 4.4.3 Relogging Dry Wells and Logging Groundwater Monitoring Wells
  - 4.4.4 Surface Geophysical Exploration
  - 4.4.5 Tissue Characterization and Analysis
  - 4.4.6 Soil Samples from Groundwater Wells

#### **SECTION 5.0 NATURE AND EXTENT OF CONTAMINATION**

- 5.1 DATA REVIEW AND EVALUATION PROCESS
  - 5.1.1 Data Quality Assessment
  - 5.1.2 Screening Levels
  - 5.1.3 Evaluation Process
- 5.2 VADOSE ZONE CHARACTERIZATION
  - 5.2.1 Analytical Data
  - 5.2.2 Direct Push and Drywell Logging Data
  - 5.2.3 Surface Geophysical Exploration
- 5.3 SUMMARY OF GROUNDWATER CONTAMINATION
  - 5.3.1 Summary of Groundwater Data Collected at WMA C
  - 5.3.2 Summary of Groundwater Contamination at WMA C
- 5.4 BIOTA CONTAMINATION
  - 5.4.1 Analytical Data
  - 5.4.2 Recommendations
- 5.5 NATURE AND EXTENT OF VADOSE ZONE CONTAMINATION
  - 5.5.1 Nature and Extent Conclusions
  - 5.5.2 Nature and Extent Data Gaps

#### **SECTION 6.0 CONTAMINANT FATE AND TRANSPORT**

- 6.1 OVERVIEW OF APPROACH FOR ASSESSMENT OF CONTAMINANT FATE AND TRANSPORT
- 6.2 CONCEPTUAL MODEL(S) OF CONTAMINANT FATE AND TRANSPORT
- 6.3 CURRENT IMPLEMENTATION OF NUMERICAL MODELS FOR EVALUATING CONTAMINANT FATE AND TRANSPORT
- 6.4 APPROACH FOR ASSESSING SYSTEM SENSITIVITY AND UNCERTAINTY
- 6.5 CONTAMINANT FATE AND TRANSPORT SUMMARY AND DATA GAPS

## **SECTION 7.0 HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT**

### **7.1 HUMAN HEALTH RISK ASSESSMENT**

- 7.1.1 Analytical Data Processing
- 7.1.2 Exposure Assessment
- 7.1.3 Toxicity Assessment
- 7.1.4 Risk Characterization
- 7.1.5 Uncertainties Analysis

### **7.2 SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT**

- 7.2.1 Identification of Ecological Contaminants of Potential Concern
- 7.2.2 Problem Formulation
- 7.2.3 Ecological Exposure Assessment
- 7.2.4 Screening Level Ecological Effects Assessment
- 7.2.5 Risk Characterization
  - 7.2.5.1 Radionuclides
  - 7.2.5.2 Chemicals
- 7.2.6 Uncertainty Analysis

### **7.3 SOIL-TO-GROUNDWATER PATHWAY EVALUATION**

### **7.4 CONCLUSIONS OF THE RISK ASSESSMENTS**

## **SECTION 8.0 SUMMARY AND RECOMMENDATIONS**

## **SECTION 9.0 REFERENCES**

### **APPENDICES (preliminary)**

#### **APPENDIX A (Goes with Section 1.0)**

- A.1 2014 WMA C Closure Meeting Notes
- A.2 2014 WMA C RCRA Facility Investigation Report Development Meeting Notes

#### **APPENDIX B (Goes with Section 3.0)**

- B.1 241-C Farm Tank Waste Receipt and Transfer Timeline Diagrams
- B.2 WMA C Waste Information Database System Table
- B.3 241-C Tank Farm Construction Photos

#### **APPENDIX C (Goes with Section 4.0; specific order not yet determined)**

- C.1 WMA C Phase 2 Investigation Field Methods Information
- C.2 WMA C Phase 2 Investigation Direct Push Sample Depth Meeting Notes
- C.3 WMA C Phase 2 Investigation Work Plan Development Meeting Notes
- C.4 WMA C Phase 2 Investigation Work Plan, Sampling and Analysis Plan, and Field Sampling and Analysis Plan Change Control Documentation
  - C.4.1 TPA Change Notices and Document Approval Letters (detailed information on changes for document revisions)
  - C.4.2 FSAP Change Notices

#### **C.5 WMA C Phase 2 Investigation Borehole Completion Reports**

#### **APPENDIX D (Goes with Section 5.0)**

- D.1 Data Quality Assessment
- D.2 Previous investigation backup information (as needed)
- D.3 Graphics and Tables – possibly several different appendices)
- D.4 Lab Reports
- D.5 Summary of Spectral Gamma Logging Data
- D.6 Spectral Gamma Logging System Data Reports

#### **APPENDIX E (Goes with Section 6.0)**

- Appendix X Additional site photos (if needed)

**ATTACHMENT B: Nature and Extent of Contamination  
Draft Figure and Table Hand-Outs  
October 1, 2014**

**October 1 – RFI Meeting**

Walk Thru Section 5 outline (overview)...different components:

- Vadose Zone Analytical (Direct Push and Samples from GW Wells)
- SGE
- Logging Data (Drywell and Direct Push)
- Tissue (Mouse Data)
- Summary of Groundwater Contamination

Focus of this discussion is on Vadose Analytical Data

Report will include:

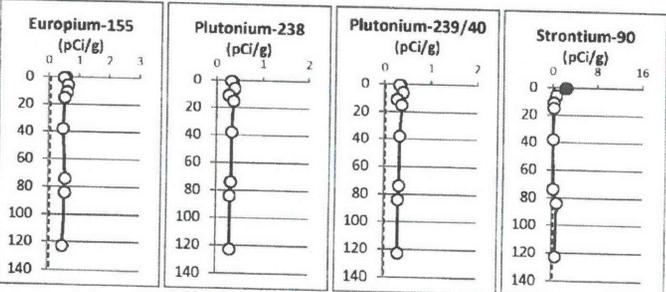
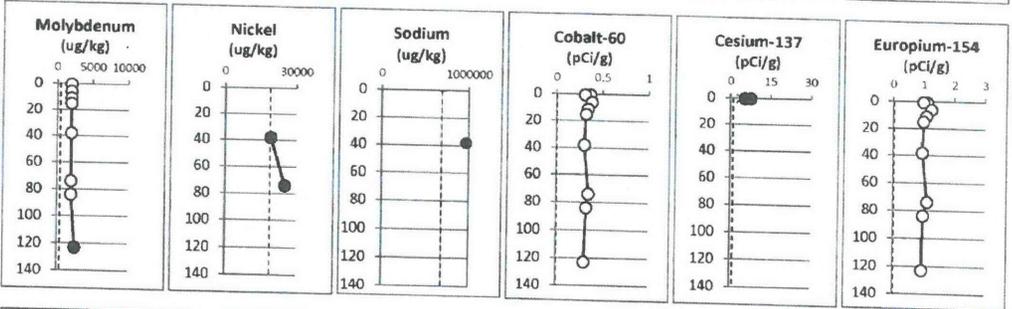
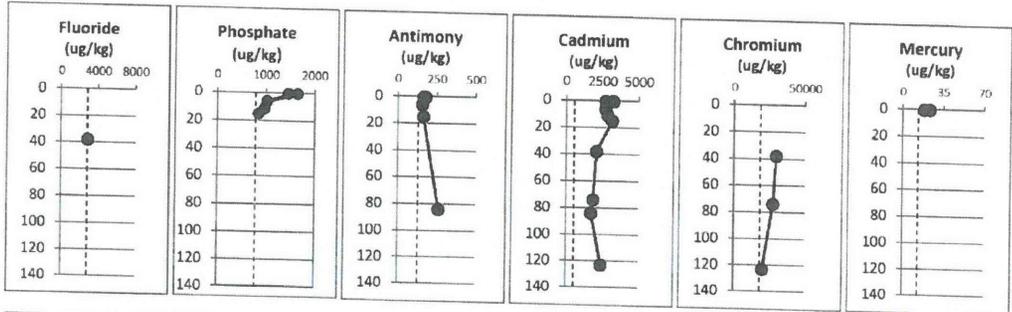
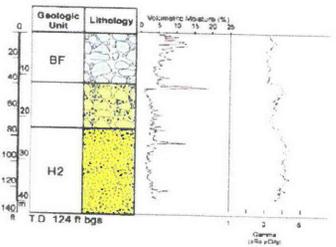
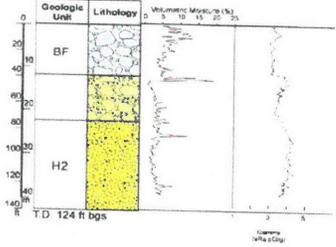
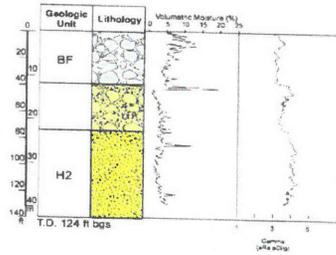
- Pre-Phase 1 RFI data: Tanaka [UPR-82] Cesium-137, 2 locations and Approximately 70 Drywell Logging Locations
- Phase 1 RFI data: UPR-82 (26 pushes, 20/40 vertical and 6 angle), C4297 (C-105), and Well 299-E27-22 (was hoped to be a background location)
- Near-term (Phase 1.5): UPR-86 (3 sample locations) and UPR-81 (part of P location in Phase 2)

Note: Phases 1 and Near-Term analyzed by PNNL

**Phase 2 RFI Analytical Data/Sampling Locations**

Investigation Group/Site	Area	Reason
A+B	C-101	Characterize C-101 release
C	C200s (C-203)	Determine if C-200s actually leaked
E	Area between C-106 and C-109	Assess transfer line release between C-106 and C-109 including <sup>60</sup> Co distribution
F+G	C-103 and Building C-801 and the building's chemical drain	Assess release of PUREX waste to building C-801 chemical drain and assess suspected transfer line release between C-103 and C-801 Building
H+I	UPR-91 and UPR-115	Evaluate surface release area NE of UPR-91 and evaluate surface release NE of UPR-115
J	C-104	Characterize potential C-104 release
L1+L2	Area between C-103 and C-106	Assess potential release from C-103 and C-106 transfer line
P	UPR-81	Evaluate UPR-81
R	Area near C-301 catch tank	Asses potential release from catch tank C-301
U	C-110	Characterize potential C-110 release
299-E27-20 (Z)	Adjacent to 299-E27-23	
299-E27-24 (Y)	Due east of 291-CR	

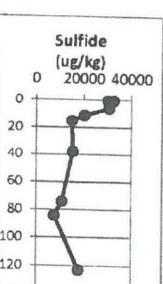
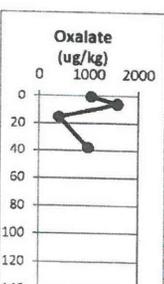
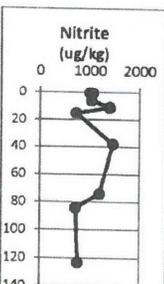
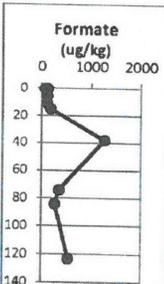
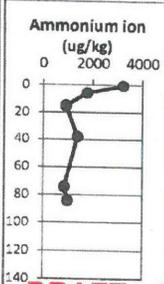
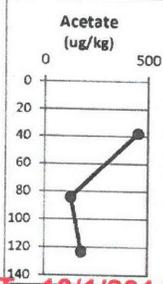
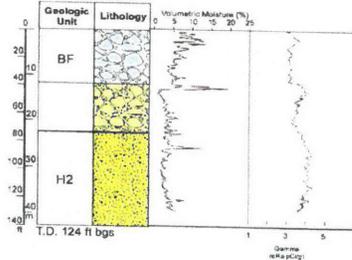
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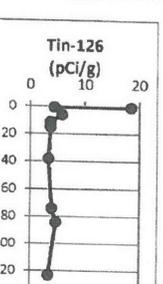
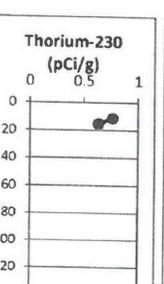
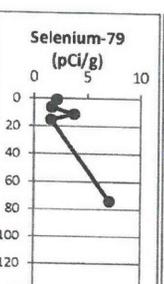
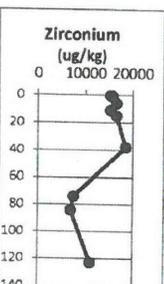
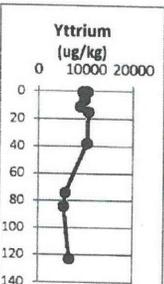
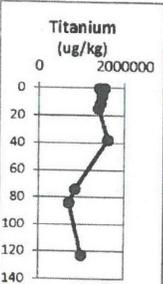
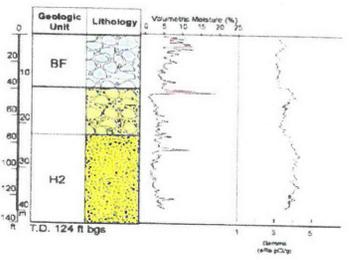
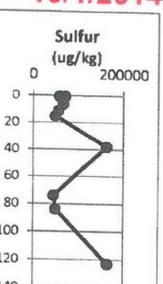
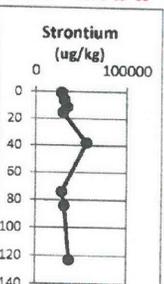
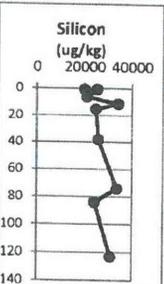
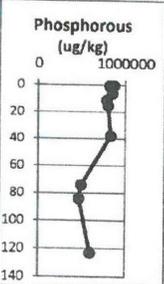
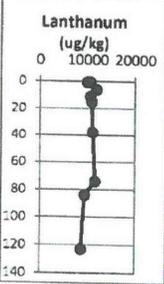
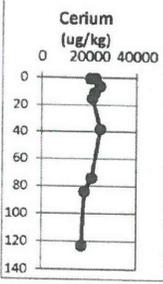
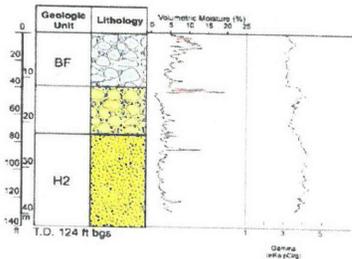
**DRAFT**  
**10/1/2014**

● Detect  
○ Non-Detect  
| Background level

# C7672

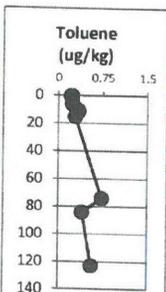
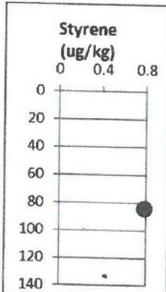
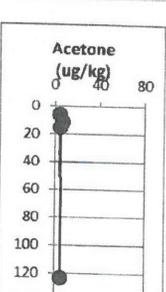
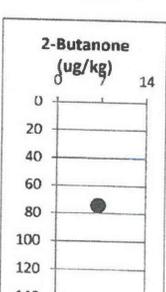
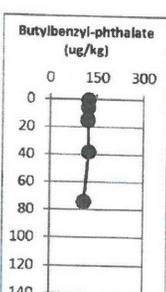
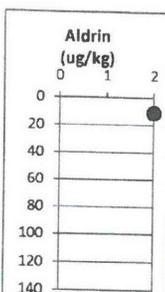
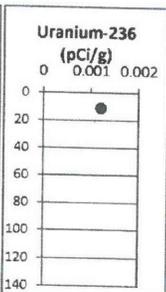
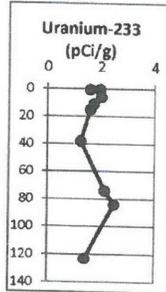
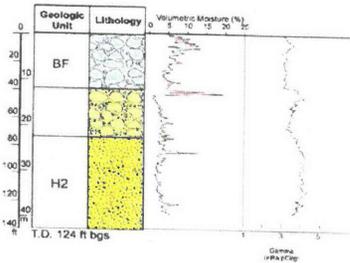
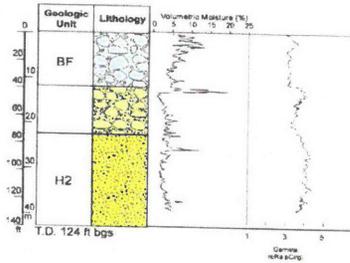


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● Detect

# C7672



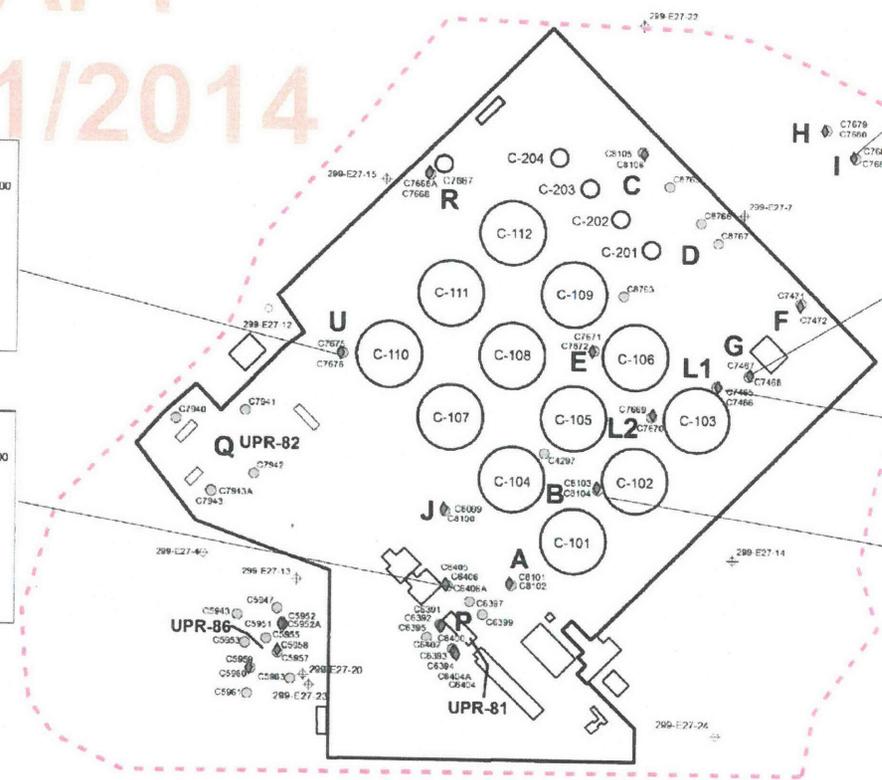
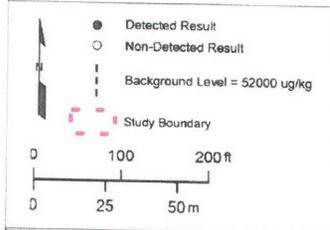
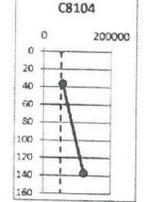
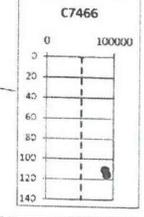
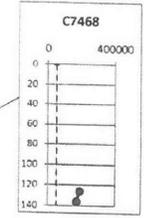
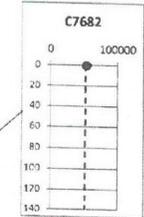
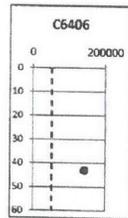
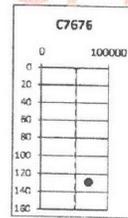
**DRAFT**  
**10/1/2014**

● Detect

**NITRATE (ug/kg)  
AT WMA C**

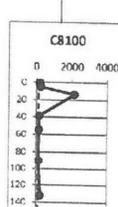
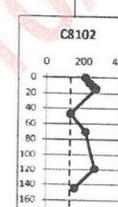
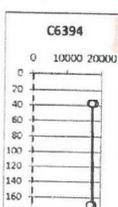
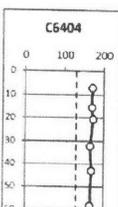
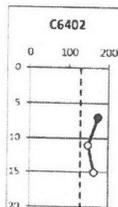
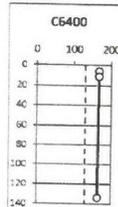
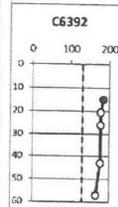
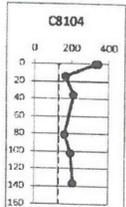
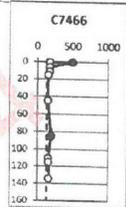
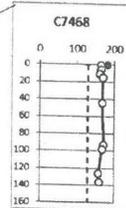
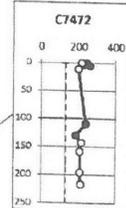
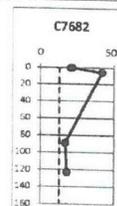
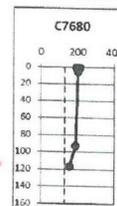
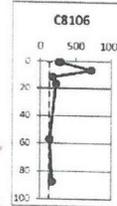
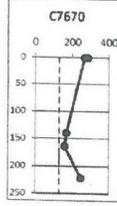
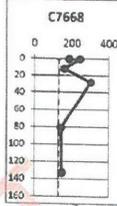
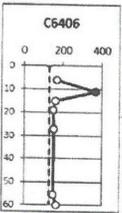
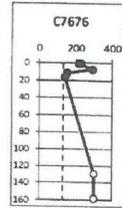
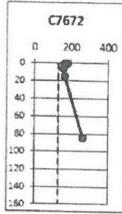
**DRAFT**  
**10/1/2014**

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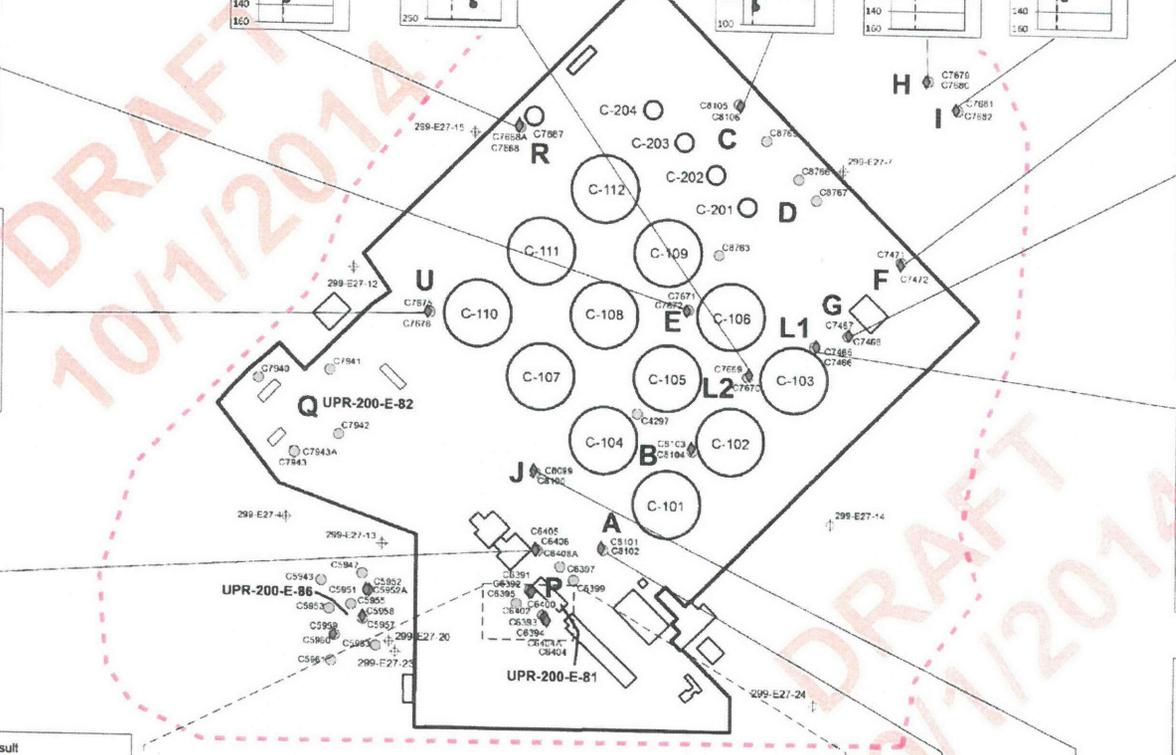


**DRAFT**  
**10/1/2014**

# ANTIMONY (ug/kg) AT WMA C

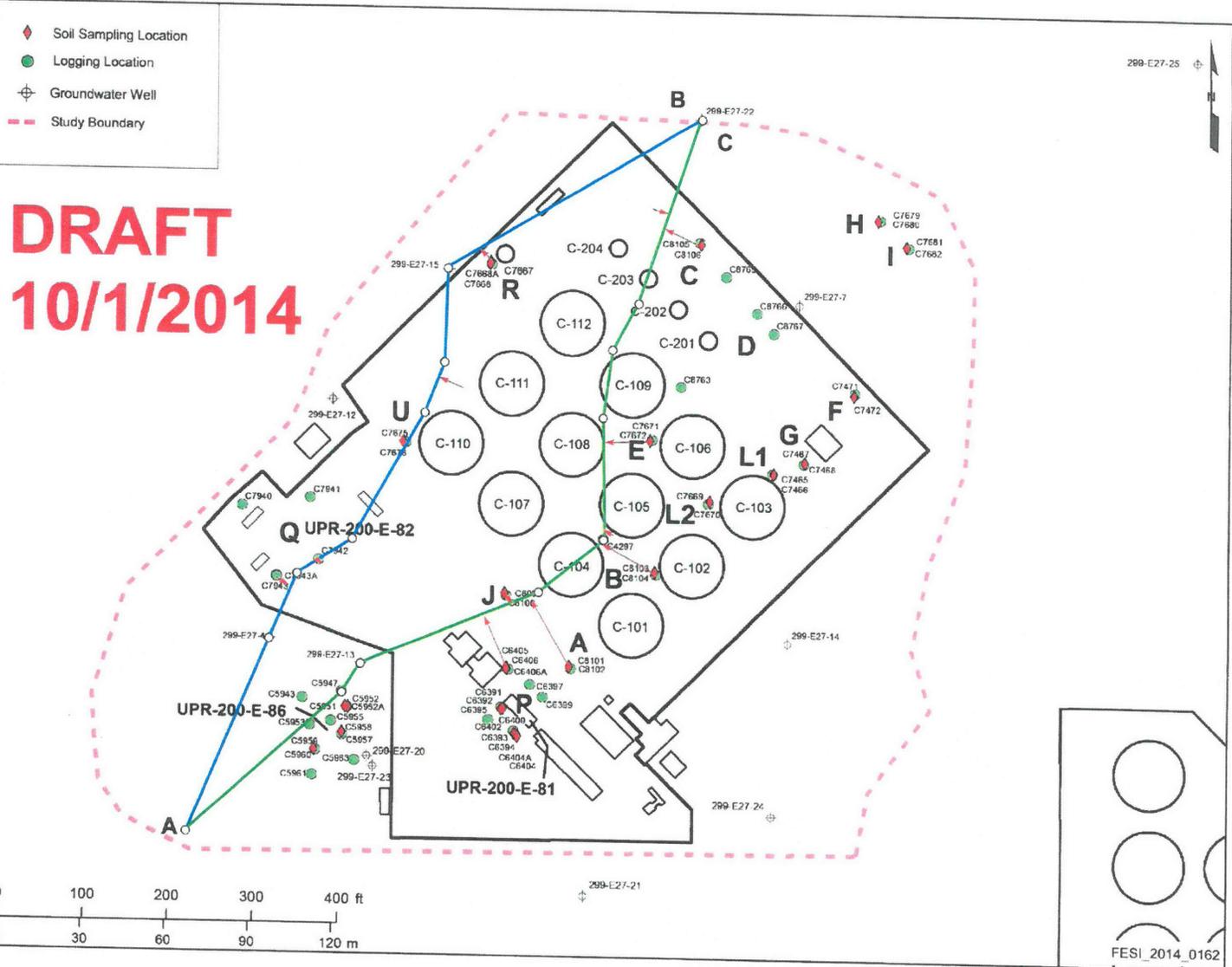


● Detected Result  
 ○ Non-Detected Result  
 - - - Background Level = 130 ug/kg  
 - - - Study Boundary

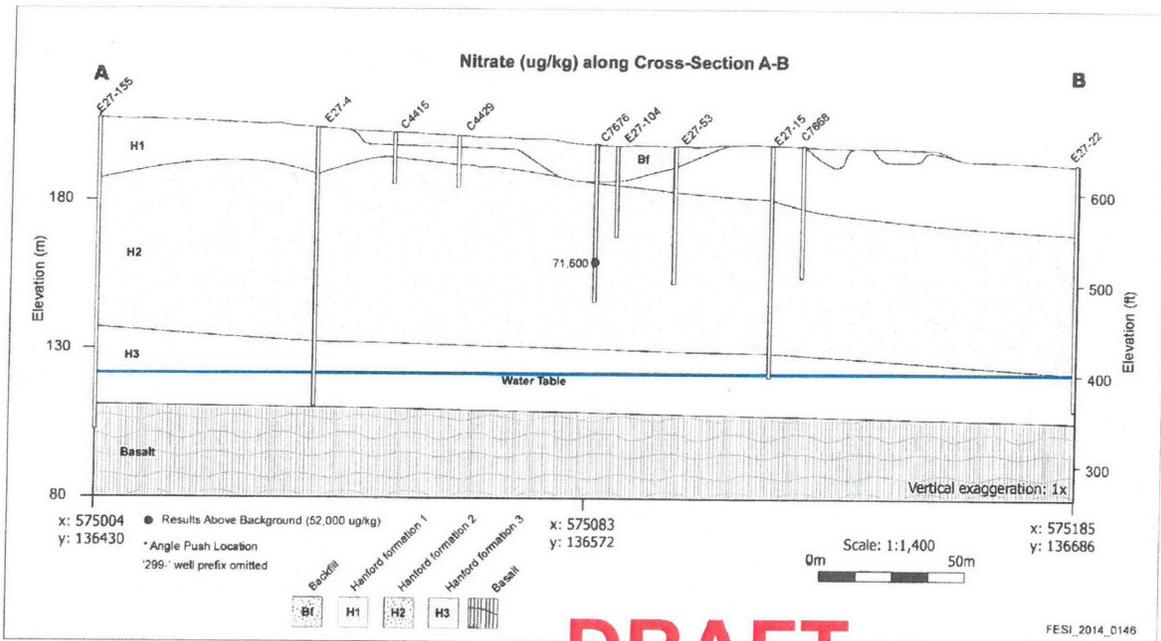


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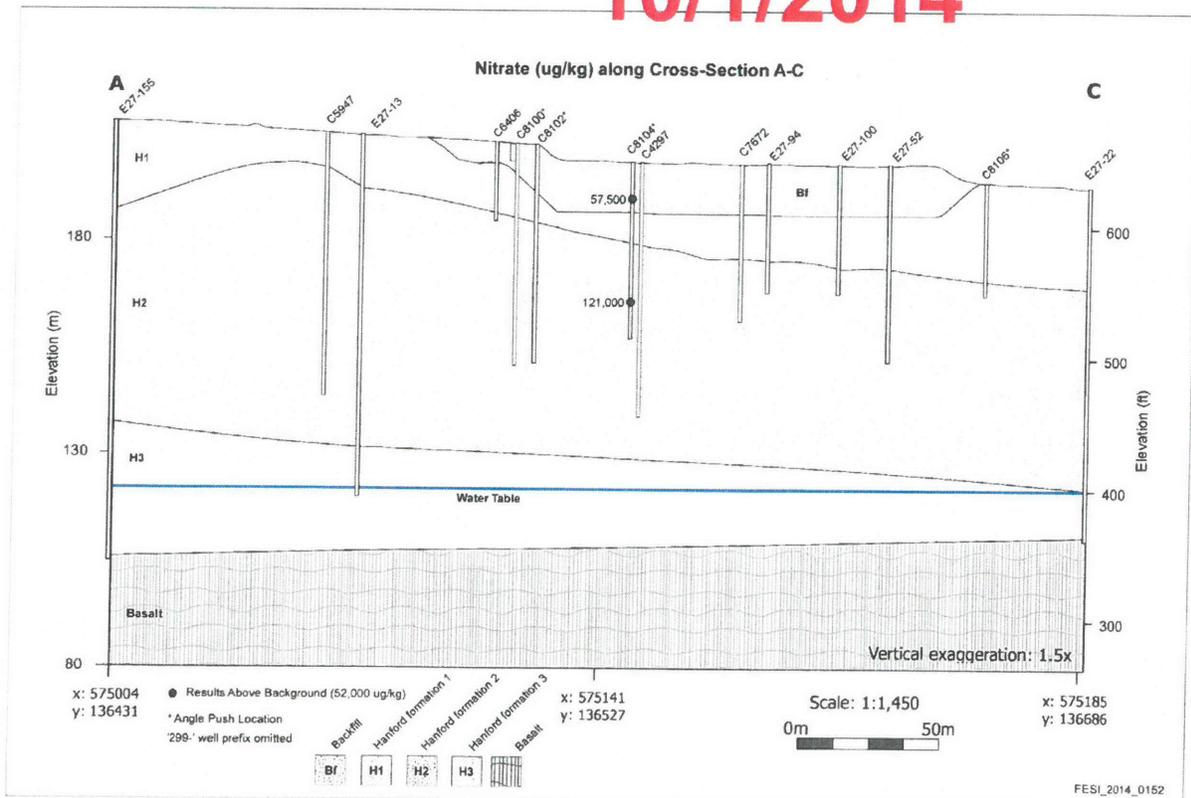
**DRAFT**  
**10/1/2014**

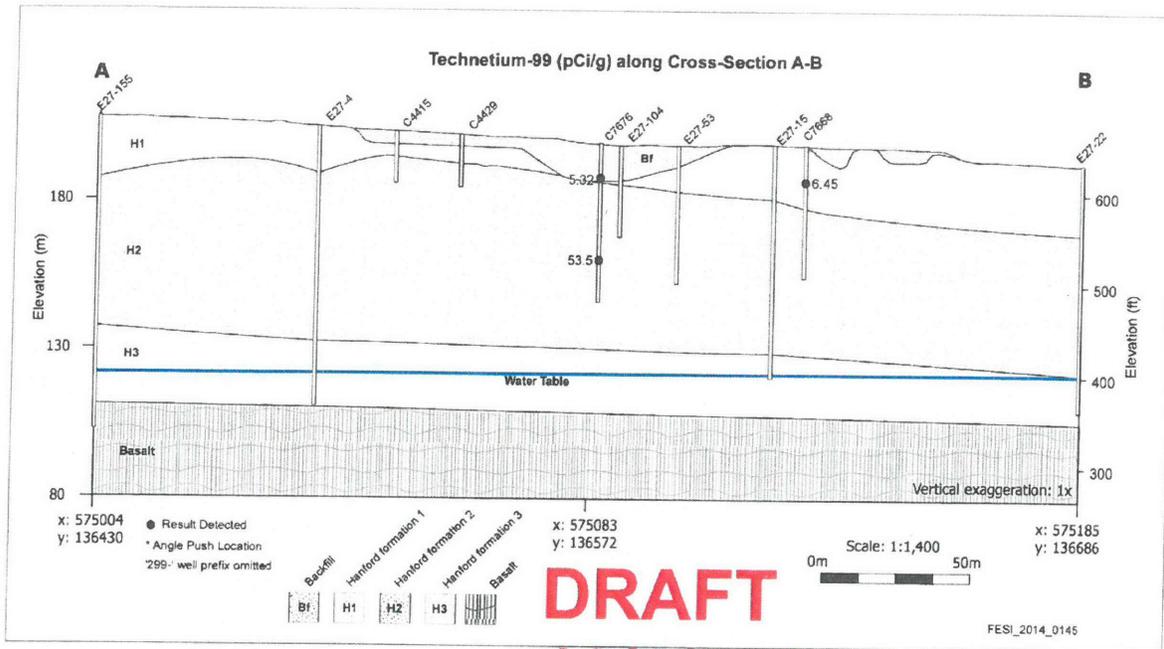


Att B-Page 7 of 10

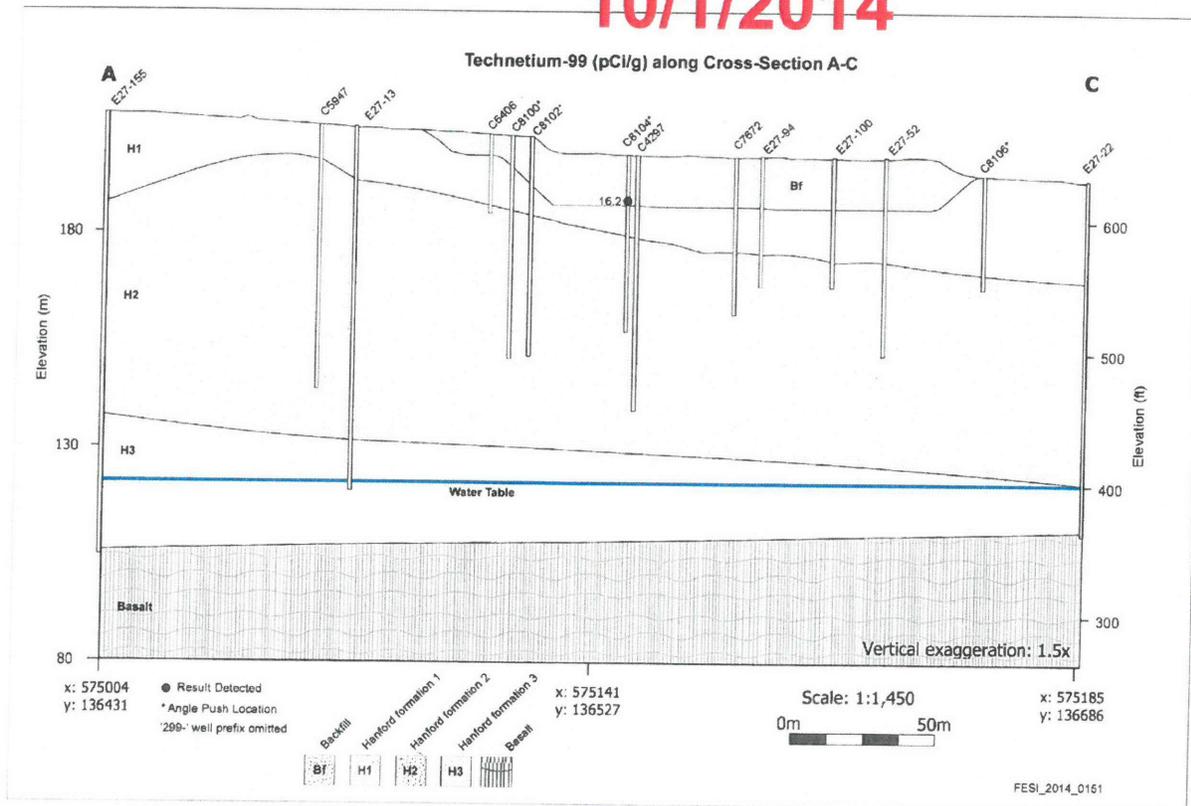


**DRAFT**  
**10/1/2014**





DRAFT  
10/1/2014



# SUMMARY OF RADS ABOVE BACKGROUND IN WELLS AT WMA C

**C8100: Direct Push Location**  
 Cesium-137: Contamination was detected at depths <= 15'  
 Potassium-40: Contamination was detected at depths > 15'  
 Strontium-90: Contamination was detected in both intervals

\* denotes angle direct push hole

**DRAFT  
10/1/2014**

**C7672:**

Cesium-137
Cobalt-60
Europium-154
Europium-155
Plutonium-238
Plutonium-239/240
Potassium-40
Strontium-90

**C8106:**

Cesium-137
Cobalt-60
Europium-154
Europium-155
Plutonium-238
Plutonium-239/240
Potassium-40
Strontium-90

**C7680:**

Cobalt-60
Europium-154
Europium-155
Plutonium-238
Plutonium-239/240
Potassium-40
Strontium-90

**C7668:**

Cobalt-60
Europium-154
Europium-155
Plutonium-238
Plutonium-239/240
Potassium-40
Strontium-90

**C7682:**

Cobalt-60
Europium-154
Europium-155
Plutonium-238
Plutonium-239/240
Potassium-40
Strontium-90

**C7676:**

Cesium-137
Cobalt-60
Europium-154
Europium-155
Plutonium-238
Plutonium-239/240
Potassium-40
Strontium-90
Thorium-232

**C8100:**

Cesium-137
Cobalt-60
Europium-154
Europium-155
Plutonium-238
Plutonium-239/240
Potassium-40
Radium-226
Strontium-90

**C7472:**

Cesium-137
Cobalt-60
Europium-154
Europium-155
Plutonium-238
Plutonium-239/240
Potassium-40
Strontium-90

**C6406:**

Cesium-137
Cobalt-60
Europium-154
Europium-155
Plutonium-238
Plutonium-239/240
Potassium-40
Radium-226
Strontium-90

**C7468:**

Cesium-137
Cobalt-60
Europium-154
Europium-155
Plutonium-238
Plutonium-239/240
Potassium-40
Strontium-90

**C6392:**

Cesium-137
Cobalt-60
Europium-154
Europium-155
Plutonium-238
Plutonium-239/240
Potassium-40
Strontium-90

**C6394:**

Cobalt-60
Europium-154
Europium-155
Radium-226

**C6400:**

Cesium-137
Cobalt-60
Europium-154
Europium-155
Plutonium-238
Plutonium-239/240
Potassium-40
Strontium-90
Uranium-234

**C6402:**

Cesium-137
Cobalt-60
Europium-154
Europium-155
Plutonium-238
Plutonium-239/240
Potassium-40
Strontium-90

**C6404:**

Cesium-137
Cobalt-60
Europium-154
Europium-155
Plutonium-238
Plutonium-239/240
Potassium-40
Strontium-90
Uranium-234
Uranium-238

**C8102:**

Cesium-137
Cobalt-60
Europium-154
Europium-155
Plutonium-238
Plutonium-239/240
Potassium-40
Strontium-90

**C8104:**

Cesium-137
Cobalt-60
Europium-154
Europium-155
Plutonium-238
Plutonium-239/240
Potassium-40
Radium-226
Strontium-90

**C7670:**

Cesium-137
Cobalt-60
Europium-154
Europium-155
Plutonium-238
Plutonium-239/240
Potassium-40
Strontium-90

